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Idaea omari Hausmann & Bläsius, sp. n. from Morocco (Lepidoptera: Geometridae, Sterrhinae)

A. Hausmann, M. Leipnitz & R. Bläsius

Abstract

A new Sterrhinae species is described from Morocco: *Idaea omari* Hausmann & Bläsius, sp. n. The new species is placed in the *aversata* species-group, close to *Idaea dromikos* Hausmann, 2004. The differential diagnosis bases on morphological and molecular analysis. Data on biology are given. Larva, pupa, adult, and genitalia of both sexes are illustrated.

KEY WORDS: Lepidoptera, Geometridae, Sterrhinae, new species, *Idaea omari*, Morocco.

Idaea omari Hausmann & Bläsius, sp. n. de Marruecos
(Lepidoptera: Geometridae, Sterrhinae)

Resumen

Se describe una nueva especie de Sterrhinae de Marruecos: *Idaea omari* Hausmann & Bläsius, sp. n. La especie está situada en el grupo de *aversata*, próxima a *Idaea dromikos* Hausmann, 2004. El diagnóstico diferencial se basa sobre un análisis morfológico y molecular. Se presentan informaciones sobre su desarrollo. Se ilustran la larva, pupa, adulto y la genitalia del macho y de la hembra.

PALABRAS CLAVE: Lepidoptera, Geometridae, Sterrhinae, nueva especie, *Idaea omari*, Marruecos.

Idaea omari Hausmann & Bläsius, sp. n. du Maroc
(Lepidoptera: Geometridae, Sterrhinae)

Résumé

Une nouvelle espèce de Sterrhinae est décrite du Maroc: *Idaea omari* Hausmann & Bläsius, sp. n. L'espèce est placée dans le groupe *aversata*, voisine de *Idaea dromikos* HAUSMANN, 2004. La diagnose différentielle base sur une analyse morphologique et moléculaire. Des informations sur le développement sont présentées. Larve, puppe, adulte, et genitalia de mâle et femelle sont illustrés.

MOTS CLÉ: Lepidoptera, Geometridae, Sterrhinae, nouvelle espèce, *Idaea omari*, Maroc.

Idaea omari Hausmann & Bläsius, sp. n. aus Marokko
(Lepidoptera: Geometridae, Sterrhinae)

Zusammenfassung

Eine neue Sterrhinae-Art aus Marokko wird beschrieben: *Idaea omari* Hausmann & Bläsius, sp. n. Die Art steht *Idaea dromikos* Hausmann, 2004 nahe und ist damit der *aversata*-Artengruppe zuzurechnen. Die Differentialdiagnose basiert auf morphologischer und molekularer Analyse. Daten zur Biologie und

Larvalmorphologie sowie Abbildungen von Raupe, Puppe und Falter sowie der Genitalapparate beider Geschlechter werden vorgestellt.

SCHLÜSSELWÖRTER: Lepidoptera, Geometridae, Sterrhinae, neue Art, *Idaea omari*, Marokko.

Introduction

Early August 2007, one of the authors (Rolf Bläsus), visited the village of Imlil near Asni at about 1600 m above sea level in the High Atlas (Morocco). In the centre of the village moths were collected on the terrace of a flat roof with the light burning until the early morning for two nights. Only two specimens of Geometridae could be collected, one *Idaea cervantaria* (Millière, 1869) and the female of a species that was retained to be *Idaea simplicior* (Prout, 1934), at a first glance. In captivity the female laid about 20 eggs. The larvae developed well and the species could be reared up to the fourth generation, so far. Taxonomic analysis, both morphological and molecular revealed this to be a good species beside the three so far known species of this group: *Idaea emarginata* (Linnaeus, 1758), *Idaea dromikos* Hausmann, 2004, and *Idaea simplicior* (Prout, 1934). In the fauna of Morocco (Rungs 1981), this taxon is partially mentioned under the name "*Idaea emarginata*" (see below under 'distribution'). In the geometrid fauna of Europe (Hausmann 2004) the Moroccan populations were thought to belong entirely to *Idaea simplicior* after dissecting a single male from the Middle Atlas.

Idaea omari Hausmann & Bläsus, sp. n. (Figs 1–7)

Holotype ♀, Morocco, High Atlas, Imlil nr. Asni, 1600 m, at light, 5-VIII-2007, leg. R. Bläsus, coll. ZSM (DNA barcode BC ZSM Lep. + 0018) (Fig. 1).

Paratypes: 346 ♂♂ ♀♀, Morocco, High Atlas, Imlil nr. Asni, 1600 m, at light, 5-VIII-2007, leg. R. Bläsus. 1 ♂ F1-F3, coll. Bläsus, Eppelheim. 1 ♂, 16 ♀♀, coll. ZSM. 9 ♂♂, 13 ♀♀, M. Leipnitz, Stuttgart. 20 ♂♂ / ♀♀, B. Müller, Berlin. Furthermore 53 ♂♂ / ♀♀, in collections P. Skou, Stenstrup (2 Paratypes), A. Steiner, Wöschbach (2 Paratypes), V. Klein, Schwetzingen (2 Paratypes), A. Hornemann, Gross-Gerau (2 Paratypes), N. Zahm, Schmelz (3 Paratypes), D. Bartsch, Stuttgart (8 Paratypes), J. Lenz, Harare (10 Paratypes), A. Vives, Museo Nacional de Ciencias Naturales, Madrid (6 Paratypes), E. Blum, Neustadt/Wstr. (2 Paratypes), E. Bettag, Dudenhofen (2 Paratypes), A. Werno, Nunkirchen (5 Paratypes), M. Meyer, Luxemburg (5 Paratypes), A. Cervelló, Barcelona (2 Paratypes) and J. P. Herzet, Lorgues (2 Paratypes).

Derivatio nominis. The name is dedicated to Omar Ait Ifraden, Imlil, Morocco, who kindly gave accommodation to many entomologists (also to Rolf Bläsus) at his famous camping place in Oukaïmeden, High Atlas, such as at his actual residence in Imlil.

Description. Adult (Figs 1–3). Wingspan in the female holotype 21.5 mm, in the reared ♂♀ 16–19 mm, exceptionally only 15 mm, probably due to suboptimal food resources during laboratory breeding. Forewing pointed at apex and at termen subapically, i. e. at ending of vein R5. Forewing termen concave between R5 and M3 / CuA1. Hindwing termen arched, with prominent teeth at M3 and CuA1. Ground colour light brown, female with slight orange tinge. Ante- and postmedial lines brown, sometimes indistinct, angled at forewing costa. Medial fascia diffuse in male, in female usually well-marked. Discal spots present but small. Terminal line brown, uninterrupted. Fringe unchequered. Frons red brown, vertex sand coloured, collar slightly darker. Antennae of ♂ with broad flagellum in lateral view, dentate, with deep intersegmental incisions, ciliate-setose, cilia 0.9–1.0 times width of flagellum. Hindtibia of ♂ slightly dilated, with large pencil. Tarsus 0.4–0.5 times length of tibia.

Male genitalia (Fig. 4). Uncus triangular, broad at base, tapered at tip. Gnathos furcate, with two very long posterior appendages. Saccus slender, prominent. Valva medially narrow, dilated at tip. Basal hair-scales absent. Aedeagus long and slender, with 5–8 cornuti.

Female genitalia (Fig. 5). Apophyses comparatively long. Ductus bursae broad, dilating towards antrum. Antrum much dilated, laterally rounded, ventrally with a slightly spinulose projection. Corpus

bursae as long as ductus bursae, elongate, strongly spinose, laterally bulbed at junction with ductus bursae.

Differential diagnosis. In habitus almost without significant and constant differential features from *Idaea dromikos* Hausmann, 2004 from Spain and southern France, but discal spots less distinct and female forms with strongly marked medial line commoner. *Idaea simplicior* from southern Spain and Morocco with termen of wings much more rounded than in the new species, ground colour paler, male antennae not dentate. Male and female genitalia with striking differences: Male genitalia of *Idaea dromikos* with much shorter furca of gnathos, and with costal spine of valva, aedeagus with weaker cornuti and cornuti usually smaller in number; female genitalia of *Idaea dromikos* with different shape of antrum (with lateral loops but without ventral projection) and without dilatation of ductus bursae posteriorly. The dentate antennae, the wing shape, in male genitalia the furcate gnathos with long appendages, the terminally dilated aedeagus, the prominent saccus and in female genitalia the shape of antrum and the strongly spinulose corpus bursae clearly characterize the new species as sister taxon of *Idaea dromikos*. For the striking differences from male and female genitalia of *Idaea simplicior* see HAUSMANN (2004).

Data on distribution, bionomics and larval stages (AH, ML & RB)

Distribution. Endemic to Morocco, possibly restricted to the High Atlas. The records of RUNGS (1981), under the name "*Idaea emarginata*", from two localities in the Rif Mountains and from "Iminène" in the High Atlas still await exact examination. The last mentioned record probably refers to the new species, but the populations of the Rif mountains may well refer to *Idaea simplicior* which was described from Sierra Nevada in southern Spain, at a distance of only 200-250 km from the Rif mountains. The distance between Sierra Nevada and High Atlas is approx. 500 km. The record of a male of *Idaea simplicior* in the ZSM from Ifrane, Middle Atlas, in HAUSMANN (2004) is confirmed by dissection.

Habitat (Figs 8-9). The type locality is situated north of the Toubkal mountain in the high valley of river Asif Mizzane. The exact collecting site is in the centre of the village of Imlil, close to a small river with surrounding nut trees and strong anthropogenous influence. The nearby slopes are characterised by very scarce vegetation. For exact botanic and geologic informations of this site see RAUH (1952: 12-17; 66-68; 88).

Phenology. In nature only collected in early August, so far. Data from laboratory breeding indicating, however, the probable bivoltinism in nature.

Rearing data, food-plants. Under laboratory conditions F1 rearing started with about 20 eggs. In subsequent rearings three females deposited 165, 205 and 236 eggs respectively, without glueing them to the substrate. The rearing was very easy, the development of the larvae always being quick and practically without losses. The whole cyclis from egg to hatching of the moths took about two months in all subsequent rearings at approx. 20-21° C, such as in other rearings at approx. 25° C. Pupation among loosely spun leaves without contact to the ground. Duration of pupal stage approx. 11 days or slightly longer at 21° C. From a large mix of offered food-plants young larvae preferred withered parts of *Polygonum aviculare*, *Taraxacum officinale* and *Cynoglossum officinale*, such as *Achillea millefolium*, the last suboptimally. *Lamia* and *Stellaria* have been refused in the first rearing. In a subsequent rearing the L1 larvae preferred clearly petals of *Rosa*, such as withered leaves of *Malva* and *Stellaria* whilst *Taraxacum officinale* and *Achillea millefolium* were refused this time. Adult larvae were reared without problems on *Bellis perennis*, *Dipsacus* and *Antirrhinum majus*. A third, more systematical rearing with food-plant preference experiments of 26 adult larvae in a 5-days period revealed *Sanguisorba minor* and leaves of *Rosa* to be the optimal food-plants; furthermore *Malva*, *Rumex obtusifolius*, *Stellaria* and *Lotus* were accepted well by several larvae. *Prunella vulgaris*, *Daucus carota*, *Sonchus* and *Achillea millefolium* were suboptimally chosen as food-resource by a very few larvae only. Other plants such as *Campanula*, *Plantago*, *Taraxacum officinale*, and *Cichorium* were completely refused by all larvae.

Results from the molecular analysis (AH)

In an analysis of mtDNA data (COI, 5', barcode fragment, 658 bp), *I. omari* Hausmann & Bläsius, sp. n. results as a well defined species of the *aversata* species-group, confirming the suggested position and species-group delimitation in HAUSMANN (2004). Genetic minimal pairwise distances are 6.1 - 9 % to *I. aversata* (Linnaeus, 1758), *I. degeneraria* (Hübner, 1799), *I. deversaria* (Herrich-Schäffer, 1847), *I. rubraria* (Staudinger, 1901) and *I. straminata* (Borkhausen, 1794). For comparison: Among the West-Palaearctic *Idaea* species, so far barcoded in the geometrid campaign of the AllLeps project (AH & Paul Hebert, Canada), the mean infraspecific nucleotide variability between populations of the same species is 0.35%, the mean infrageneric nucleotide variability between species is 10.3% (n= 51 species, 145 individuals; mean of minimal pairwise distances).

The closest allies *Idaea emarginata* (Linnaeus, 1758), *I. dromikos* Hausmann, 2004 and *I. simplicior* (Prout, 1934), have all been submitted to DNA barcoding too, but none of them is successfully sequenced, so far. The results will be analysed and published later on.

Acknowledgement

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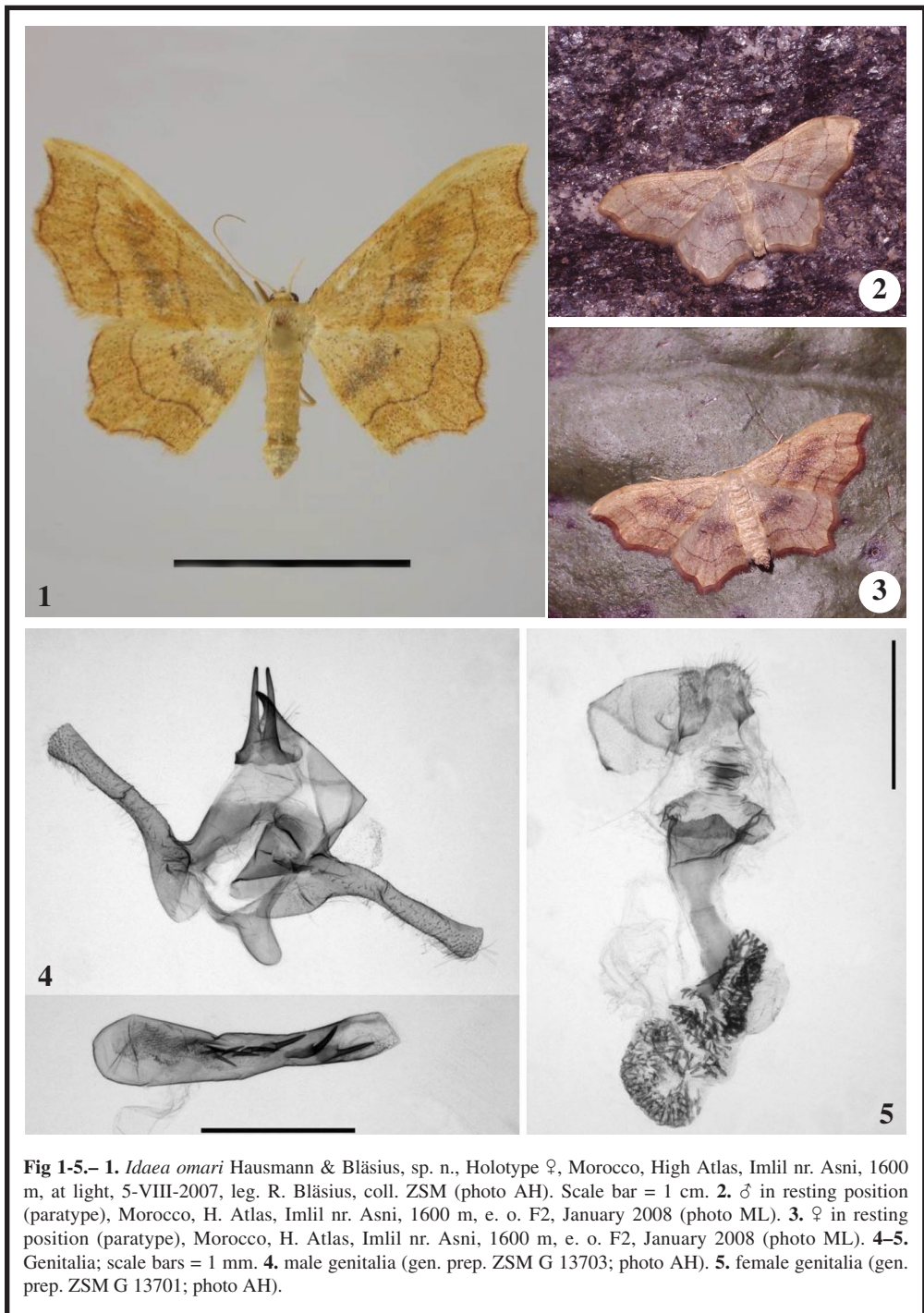


Fig 1-5.— **1.** *Idaea omari* Hausmann & Bläsius, sp. n., Holotype ♀, Morocco, High Atlas, Imlil nr. Asni, 1600 m, at light, 5-VIII-2007, leg. R. Bläsius, coll. ZSM (photo AH). Scale bar = 1 cm. **2.** ♂ in resting position (paratype), Morocco, H. Atlas, Imlil nr. Asni, 1600 m, e. o. F2, January 2008 (photo ML). **3.** ♀ in resting position (paratype), Morocco, H. Atlas, Imlil nr. Asni, 1600 m, e. o. F2, January 2008 (photo ML). **4-5.** Genitalia; scale bars = 1 mm. **4.** male genitalia (gen. prep. ZSM G 13703; photo AH). **5.** female genitalia (gen. prep. ZSM G 13701; photo AH).



Figs 6-8.- 6-7. Immature stages of *Idaea omari* sp. n. **6.** full grown larva (photo ML). **7.** pupae in lateral, ventral, and dorsal view (photo ML). **8-9.** Type locality and surrounding area: habitat of *Idaea omari* sp. n. **8.** 1km E of Imlil (High Atlas, Morocco) with view to south in the direction of Toubkal mountain. **9.** village of Imlil, collecting site on the flat roof terrace (photos RB)